



# Immune System - Newborn

Perinatal Infections

Student Version

# Newborn Defenses

- ☛ **Skin is our first line of defense**
- ☛ **Reticuloendothelial System**
- ☛ **Antibody formation**
  - **IgG from pregnant mom-fetus**
  - **IgM**
  - **Breastfeeding**

# Methods of acquiring infection

- Transplacentally
- Ascending
- Hospital acquired

**\*Newborn response to infection=**

Vague  
Sepsis!

# HIV

- Retrovirus
- Transmission to baby
  - Transplacentally
  - Maternal fluid contact during birthing process
  - Breast feeding

Pregnancy effects on the HIV + Mother:

- Even lower immune system
- Increased susceptibility to infections
- Increased susceptibility to developing AIDS

# Prevention of Perinatal Transmission of HIV

Antiretroviral (ARV) drugs can reduce perinatal transmission of HIV.....

- All pregnant women with acute or recent HIV infection should start a combination antiretroviral drug regimen as soon as possible to prevent perinatal transmission

# To Reduce Perinatal Transmission:

- Antepartum
  - Combination Antiretroviral Drugs (ARV)
  - Start in 1<sup>st</sup> trimester if possible or as early as possible
- Intrapartum
  - Avoid Artificial Rupture of Membranes
  - Avoid fetal scalp electrodes, forceps, vacuum deliver, episiotomy if possible
  - C-section indicated if viral load is high
  - IV zidovudine (ZDV) during labor is administered to mother
- Postpartum
  - Avoid breast feeding
  - 4 weeks of ZDV prophylaxis to infant or 6 weeks depending on mom's illness, start within 6-12 hours of birth

## **HIV Exposed Neonates:**

- 6-week regimen zidovudine chemoprophylaxis
- Initiate within 6–12 hours of delivery
- Virologic tests to diagnose HIV infection:
  - Within the first 14–21 days of life
  - At 1–2 months and 4–6 months of age
  - Diagnosis of HIV infected = 2 positive results
- Follow-up of children exposed to ARVs into adulthood
- Home Considerations
  - Proper hand washing, soiled diapers in sealed bags, bleach solution to clean changing area

# Gonorrhoea

- ☞ Can cause bacterial conjunctivitis
  - Ophthalmitis
  - Septicemia
- ☞ Mode of Transmission
  - Spreads from infected cervix, contact with birth canal
- ☞ Symptoms- mucopurulent discharge
- ☞ DX- bacterial cultures
- ☞ Treatment- Ceftriaxone & contact isolation
  - PCN/Erythromycin also can be used
- ☞ Prevention- Erythromycin ointment

# TORCH Syndrome

- ☛ Toxoplasmosis

- ☛ Other

- Syphilis, Hepatitis B, Varicella, Parvovirus, HIV, West Nile, Zika, Measles & Mumps

- ☛ Rubella

- ☛ Cytomegalovirus

- ☛ Herpes

- Can all actively infect the fetus

# IORCH- Toxoplasmosis

- ☛ Parasitic organism- *Toxoplasma gondii*
- ☛ Transmission to neonate
  - Transplacental
- ☛ Fetal Effects
  - Damage to liver, brain, eyes, preterm birth, miscarriage, stillborn, developmental disabilities
  - At birth can have jaundice, rash, enlarged spleen and nodes
- ☛ Diagnosis- IgM, IgG, PCR testing
- ☛ Treatment- sulfadiazine and pyrimethamine

# TORCH- OTHER

- ☛ Hepatitis B
- ☛ Parvovirus
- ☛ HIV
- ☛ West Nile
- ☛ Syphilis
- ☛ Chlamydia

# TORCH – “Other” Syphilis

☛ Treponema Pallidum Spirochete

☛ Transmission

- Direct contact with exudates
- Transplacental

☛ Fetal Effects

- Rash/lesions, nasal discharge, anemia, poor feeding, painful extremities and joints, fever, low birth weight, enlarged liver/spleen

☛ Diagnosis- RPR test

☛ Treatment- PCN IV

# TORCH- “Other”

## Chlamydia

- ☛ Chlamydia trachomatis
- ☛ Fetal effects
  - NB conjunctivitis
  - Preterm birth
  - Pneumonia
- ☛ Treatment
  - PO erythromycin or azithromycin

# TORCH -Rubella

☞ 'German measles' virus

☞ Transmission

- Droplet, Direct contact
- Transplacentally

☞ Fetal Effects

- Rubella loves the heart and eyes
- Microcephaly, cataracts, vision difficulties, hearing difficulties
- CNS involvement: seizures, cognitive impairment
- Meningitis, enlarged liver
- Mental disability, congenital heart defects

☞ Diagnosis

- IgM

# TORCH - Cytomegalovirus (CMV)

## Transmission

- In utero
- During labor for the preterm infant
- Breastfeeding for the preterm infant

## Fetal effects

- IUGR
- Hepatosplenomegaly
- Petechiae or purpura (blueberry muffin spots)
- Severe CNS manifestations

## DX: PCR saliva test

## Treatment

- Antivirals- IV ganciclovir or PO valganciclovir
- CT of brain to determine extent CNS involvement

# TORCH<sub>H</sub> -Herpes

## ☛ Type I

- Fever blisters, cold sores

## ☛ Type II

- genital

## ☛ Mode of transmission

- Direct contact
- Rare - in utero

# TORCH - Herpes

- ☞ Diagnosis- culture of lesions
- ☞ Fetal effects
  - Lesions, inflammation of the liver, rash, neuro involvement, meningitis
- ☞ Management
  - Universal standard precautions
  - C-section
  - IV acyclovir

# Group B Strep

## ☞ Women can be silent carriers

- Transmission direct contact birth canal

## ☞ Early onset S/S

- Respiratory involvement, meningitis, poor feeding, apnea, pneumonia

## ☞ Later onset S/S

- Meningitis, bacteremia, lethargy

## ☞ Diagnosis- vaginal/rectal culture swab

- Infant- blood culture, CSF

## ☞ Treatment protocol

- Ampicillin, gentamicin, penicillin G

# E-coli

- ☛ Can cause sepsis/meningitis
- ☛ Transmitted by direct contact
  - Contact during birth or after birth
  - Contaminated hands, equipment
- ☛ Tx-IV Antibiotics
  - Ciprofloxacin

# Staph Scalded Skin Syndrome

Exposure to staph aureus causes a toxin to be released in blood stream which causes:

## NB Effects

- ☛ Red skin, appears scalded with hot water, then blisters
- ☛ Skin sloughs off body in sheets
- ☛ Insensible fluid loss! Infant can look toxic....

## DX & Treatment

- ☛ Skin biopsy, culture
- ☛ IV Antibiotics
- ☛ Skin care- keep it clean and dry, warm
- ☛ Fluids

Benign usually with full recovery!

Prevention is to have clean environment!